

REMARKS

The Office Action mailed on April 14, 2005 has been carefully considered and the Examiner's remarks are appreciated. Claims 1-20 were originally in the application. In affirmation of the telephonic provisional election made on April 8, 2005 in response to a restriction requirement, Applicants elect Group II, claims 7-17 for prosecution, and claims 1-6, and 18-20 are withdrawn. In addition, claims 8, 12, 13, 15, and 16 have been canceled, and claims 7, 9, 14, and 17 have been amended. Therefore, claims 7, 9-11, 14, and 17 are presented here for examination. Applicant respectfully request reconsideration of the rejection of claims 7, 9-11, 14 and 17 in view of the amendments and the following remarks. No new matter has been added, with the amendments supported by the Specification, claims, and the drawings.

Discussion of the Rejections Under 35 USC §102

The Examiner rejected claims 7, 8, 12, and 13 under 35 USC §§102(a) and (e) as being anticipated by U.S. Publication No. 2001/0024633 to Lee et al ("Lee"), and claims 7-10 and 12-16 under 35 USC §102(e) as being anticipated by U.S. Publication No. 2004/0149209 to Dai et al ("Dai"). As mentioned above claims 8, 12, 13, 15, and 16 have been canceled.

Applicant has amended independent claim 7 to clarify the distinctions from the prior art. In part, claim 7 has been amended to include the limitations of claims 12, 13, 15, and 16, now canceled. Additionally, claim 7 has been amended as follows:

"...said growing step including controlling CVD pyrolysis parameters to produce irregularly sized mesh pores of 10 to 200 nanometers between said nanotubes capable of separating, concentrating, and/or filtering molecules flowed through said carbon nanotube mesh."

The amendment shown above clarifies that the "*pore sizes of 10 to 200 nanometers*", originally found in now-canceled claim 12, is not the pore size of a nanotube (as suggested by Examiner as inherent), but is rather the size range of the irregular mesh pores formed between the intertwined nanotubes. This size range functions to enable the mesh to perform separation, concentration, and/or filtering of molecules. Thus, the amended limitations of using a thin film Fe layer as a catalyst, and the step of controlling the CVD pyrolysis parameters serve to achieve the claimed mesh construction/dimensions.

In contrast, Applicants respectfully submit that neither Lee or Dai discloses the controlling of CVD pyrolysis parameters to produce such irregularly sized mesh pores of 10 to 200 nanometers to enable separation, concentration, and/or filtering of molecules. Lee, as suggested by its title, discloses a method of vertically aligning nanotubes, and not a method of creating an intertwined mesh with mesh pores of 10 to 200 nm. While Figures 3A and 3B in Lee show intertwined carbon nanotubes, these are described as a "typical thermal chemical vapor deposition technique," without further providing the control of CVD pyrolysis parameters to achieve the required 10 to 200 nm mesh pore size range. In contrast to Lee, the Dai reference does disclose in a first experiment the fabrication of non-aligned carbon nanotubes. However, Dai also does

not disclose the step of controlling CVD pyrolysis parameters to achieve 10 to 200 nm mesh pores.

Thus it is respectfully submitted that the 102 based rejection against amended independent claim 7 is overcome by the aforementioned amendments, as not having each and every element in the claim either expressly or inherently described in a single prior art reference, as required by MPEP §2131. Furthermore, Applicants submit that claims 9-11, 14, and 17 are also allowable as being dependent on a now allowable claim.

Notwithstanding the above, Applicants respectfully submit that the step of "functionalizing the surfaces of the nanotubes to chemically select/discriminate molecules" claimed in dependent claims 9 and 10 is not disclosed in the Dai reference as suggested by Examiner, citing paragraphs 40-44. Paragraphs 40-44 in Dai discuss "hetero-structured multilayer carbon nanotube films" where the carbon nanotube layers are interposed between layers of pyrolysis resistant material. This is clearly not a functionalizing of the surface of the nanotubes themselves.

With regard to dependent claim 14, Applicants also submit that neither Lee or Dai disclose the particular combination of pyrolysis parameters, i.e. a mixture of ethylene, hydrogen, and argon at 850 degrees, which is used to achieve the 10-200 nm mesh pore size range. This combination is one preferred parameter for achieving the claimed mesh pore construction/dimensions.

Discussion of the Rejections Under 35 USC §103

The Examiner also rejected claim 17 under 35 USC §103(a) as being unpatentable over the Dai reference. In support of his rejection, the Examiner stated that it would be obvious to one of ordinary skill in the art to use 5 microns thickness for the iron catalyst which Dai does not teach. However, the limitation in claim 17 calls for 5 nanometers, not 5 microns, which nanoscale may involve different physical properties (e.g. mechanical, chemical, electrical) and therefore different, non-scalable fabrication processes. Additionally, and in light of the claim 7 amendments discussed above, Applicants submit that the 5 nanometers iron thickness is not taught or suggested in the prior art to achieve the claimed 10-200 nm mesh pore size range for separating, concentrating, and/or filtering molecules.

The Examiner also rejected claim 11 under 35 USC §103(a) as being unpatentable over Dai in view of Christel. Contrary to the Examiner's statement, Christel does not pertain to nano-structures, but rather to microstructures, which as stated above involve different fabrication processes. In particular Christel discloses vertical column microstructures with "ligand binding entities" which are actively or passively attached to the surface of the microstructures, to form a specific analyte-capturing surface (col 9, lines 50-67). There is no teaching or suggestion in either reference to combine such a surface coating process to the surface of randomly extending, intertwined nanotubes, and the combination is therefore improper hindsight.

Summary

Applicant therefore respectfully submits that claims 7, 9-11, 14 and 17 are in condition for allowance, and requests allowance of claims 7, 9-11, 14 and 17. In the event that the Examiner finds any remaining impediment to the prompt allowance of these claims that could be clarified with a telephone conference, he is respectfully requested to initiate the same with the undersigned at (925) 422-7274.

Respectfully submitted,



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